



- 1 5. The shut-down procedure according to claim 2,  
2 wherein the size of the applied auxiliary load is  
3 selected to reduce the cell voltage to about 0.2  
4 volts or less in less than 1.0 minute.
- 1 6. The shut-down procedure according to claim 5,  
2 wherein the auxiliary load continues to be applied  
3 during step B.
- 1 7. The shut-down procedure according to claim 2,  
2 wherein during the application of the auxiliary  
3 load a flow of air is maintained through the  
4 cathode flow field.
- 1 8. The shut-down procedure according to claim 1,  
2 wherein the step of displacing the fuel comprises  
3 moving a front of air through the anode flow field  
4 in less than 1.0 second.
- 1 9. The shut-down procedure according to claim 8,  
2 wherein the front of air moves through the anode  
3 flow field in less than 0.2 seconds.
- 1 10. The shut-down procedure according to claim 9,  
2 wherein the front of air moves through the anode  
3 flow field in less than 0.05 seconds.
- 1 11. The shut-down procedure according to claim 9,  
2 wherein the flow of air to the cathode flow field  
3 is stopped during the time the said front of air is  
4 moving through the anode flow field.
- 1 12. The shut-down procedure according to claim 2,  
2 wherein the step of displacing the fuel comprises  
3 moving a front of air through the anode flow field  
4 in less than 1.0 second.
- 1 13. The shut-down procedure according to claim 12,  
2 wherein the air front moves through the anode flow  
3 field in less than 0.2 seconds.
- 1 14. The shut-down procedure according to claim 12,  
2 wherein the air front moves through the anode flow  
3 field in less than 0.05 seconds.

- 1 15. The shut-down procedure according to claim 1,  
2 wherein, during normal fuel cell operation under  
3 load, a recycle blower within a recycle loop  
4 recirculates at least a portion of the anode flow  
5 field exhaust through the anode flow field; and  
6 wherein in step (B) the air is blown into and  
7 through the anode flow field using the recycle  
8 blower and without recirculating the anode exhaust.
- 1 16. The shut down procedure according to claim 15,  
2 wherein after step (A) and before step (B),  
3 connecting an auxiliary resistive load across the  
4 anode and cathode in an external circuit.
- 1 17. The shut-down procedure according to claim 16,  
2 wherein the step of displacing the fuel comprises  
3 moving a front of air through the anode flow field  
4 in less than 1.0 seconds.
- 1 18. The shut-down procedure according to claim 16,  
2 wherein the step of displacing the fuel comprises  
3 moving a front of air through the anode flow field  
4 in less than 0.2 seconds.
- 1 19. The shut-down procedure according to claim 18,  
2 wherein the step of displacing the fuel comprises  
3 moving a front of air through the anode flow field  
4 in less than 0.05 seconds.
- 1 20. The shut-down procedure according to claim 19,  
2 wherein the auxiliary load is applied until the  
3 cell voltage is reduced to about 0.2 volts or less.
- 1 21. The shut-down procedure according to claim 17,  
2 wherein the auxiliary load is applied until the  
3 cell voltage is reduced by at least 0.1 volt before  
4 step (B).
- 1 22. The shut-down procedure according to claim 20,  
2 wherein the auxiliary load continues to be applied  
3 during at least a portion of step (B).

- 1 23. The shut-down procedure according to claim 21,  
2 wherein the auxiliary load continues to be applied  
3 during at least a portion of step (B).  
1 24. The shut-down procedure according to claim 20,  
2 wherein the auxiliary load continues to be applied  
3 during step B until all the fuel has been displaced.

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